



# Dental adhesives for dentures – indications application and comparative characteristics

Dr. Radostina Vasileva MD, PhD

*Department of Dental Materials Science and Propaedeutics of Prosthetic Dental Medicine,  
FDM, MU – Varna*

## Abstract

Denture adhesive is a product known since the early 20<sup>th</sup> century and it is still widely used to improve retention and stabilization for removable dentures. Prosthetic adhesives are suitable for use when is available atrophy of the alveolar ridge, the presence of decubitus injuries and inconsistencies in the relief of the alveolar ridge. Prosthetic adhesives are known in three main forms, cream, powder and plates/pads. Different forms have advantages and disadvantages in a varied clinical situation. The urgency of the problem is expressed in the scarce information about consumables in the literature and textbooks of dentists. Information on the choice of one or another form dental adhesives for dentists and their patients would guide them in the correct choice of adhesive product when they needed.

The purpose of this article is to compare the advantages and disadvantages of using the two main forms denture adhesive: cream/gel type and plate/pad type, to facilitate the dentist choice and their patients.

**Materials and methods:** For the purpose of the research the data bases of PubMed, Scopus, Medline are considered, covering the search period is in 1960–2020 y.

**Results and conclusion:** The main reason for using adhesives is to improve the retention of dentures. The period of use of denture adhesives varies in a wide range from 1 to 30 years. This requires the study and awareness dentist about the relevant products, which are widely used to this day.

**Keywords:** complete dentures, dentures adhesives, retention, adhesive, removable dentures, cream, pad

## Introduction

The technical design of removable prostheses, especially complete ones, is a complex combination of the clinician's experience and the patient's expectations. Even the most perfectly created complete dentures may not justify what the patient thinks he will get, especially in terms of retention and stabilization. This is extremely important factor that are fundamental in the expectations of patients [1].

The main worries are associated with the use of removable complete dentures, especially in public places and in the presence of people. Of course, if prosthetic constructions are made perfectly, that have full compliance with the relief of the mucosa and perform perfectly the tasks of retention and stabilisation, do not need to be maintained with dental adhesives.

The rules and the need for the use of dental adhesives must be clear, often they are complexes and important in preservation the microflora in the oral cavity [2]. The first applications of dental adhesives date to 1913 [3]. Dental adhesives in various forms have been used for a long time. Their application began to develop especially strongly in the period between 1920–1930y. [4–6]. In 1935 the American Dental Association (ADA), recognized dental adhesives as a medical product, until then they were considered as a non-medical products. According to Zarb et al., the term “dental adhesive” responding to a commercially, non-toxic, available, soluble material, which is placed on the inner surface to complete dentures and increases retention,

stability and function [7].

The use of complete denture over the years has been difficult, both by the dentist in the one hand and as patient use in the other hand. The dentists rarely recommended the use of the dental adhesive, as a sign for their low professional work [8]. There were also concerns about the development of gingival hyperplasia and bone resorption.

Patients find it embarrassing to use prosthetic adhesives mainly, in a purely psychological aspect of additional difficulty, taste and neuroreceptor changes [9]. Today the dental adhesives are available in different types mainly, such as cream, powder and pads. Their content is usually pectin, gelatin, cellulose, hexachlorophene and other elements. The dental adhesives must have certain properties, the main ones being biocompatibility, easy application, good retention strength, lack of taste and color. The use of dental adhesives supports nutrition, retention, occlusion and speech.

Many patients using adhesives over time learn to use their dentures better and manage to eliminate the daily application of the prosthesis with an adhesive. About 30% of patients with prostheses use an adhesive to improve the retention, stabilisation, nutrition and speech of their prostheses to varying degrees.[10,11]

The main indications for the use of dental denture adhesives are:

to stabilize the determination of occlusion

- ✓ to steady temporary prostheses
- ✓ to stabilize existing prostheses during oral surgery

- ✓ psychological support
- ✓ use in adult patients
- ✓ use in case of insufficient anatomical structures
- ✓ patients with mental problems
- ✓ new prostheses
- ✓ implant supported prostheses
- ✓ partial dentures
- ✓ xerostomia

Contraindications to the use of dental denture adhesives are:

- ✓ allergy to any of the ingredients of the adhesive
- ✓ neoplasms in the mouth
- ✓ mucosal hypertrophy
- ✓ poor oral hygiene

Different forms of dental adhesive for dentures also have different features and methods of application. According to the form in which they are offered as a:

- ✓ cream/gel;
- ✓ dust/powder;
- ✓ substrates/plates/pods;

Adhesives such as cream are the easiest to apply, they are almost universal. The restraining force is sufficient to meet the daily needs of patients. Powder molds are more difficult to apply due to the fact that they must be further moistened to increase adhesion. The forms of pads or plates are used mainly for larger discrepancies between the surface of the dentures and the mucosa, in the presence of decubitus injuries. (fig.2)

According to their solubility, they are divided into:

- ✓ soluble: cream, powder, paste; (fig.1)
- ✓ insoluble: substrates, pads forms [12,13]; (fig.2)



**Fig.1.** Adhesive paste



**Fig.2.** Adhesive pad form



By the year 2000, 55 million prosthetic adhesives had been sold in the USA for about \$ 200 million. The purpose of the review is to investigate the difference between a denture adhesive in the form of a cream and pads.

## Materials and methods

For the purpose of the study, the databases of PubMed, Scopus, Medline were considered. The search period is 1960–2020. As keywords are used, adhesive, removable dentures, cream, pad, dental.

## Results and discussion

Dental adhesives in the form of creams and pads are differ significantly from each other. Adhesive cream is stored in tubes and applied by squeezing on the prosthetic surface. They are usually placed evenly in a small amount and pressed for about 2 minutes until a load is applied.

Denture adhesives are used to improve the retention and stability of complete dentures [14]. Denture adhesives significantly increase denture retention at all time intervals ( $P < 0.0001$ ). [15] The basic components of dental denture adhesives are vegetable gum or synthetic polymer as carboxy-methyl cellulose and polyvinyl methyl. As the adhesive absorbs water and the carboxymethylcellulose comes in contact with the saliva, the hydrate material (free carboxyl groups) is formed and swells greater than their original volume, thereby excluding air between denture bases and bearing tissue. The hydrate material sticks to the fitting surface of the denture and oral mucosa and increases the viscosity of the saliva. These actions increase the retention of complete dentures. Free carboxyl groups formed by the wetting of adhesives such as methyl cellulose or hydroxyl methyl cellulose, form electrovalent bonds that produce stickiness or strong bioadhesive forces [16,17]

Adhesives in the form of plates are soaked plates in which better sealing of areas with decubitus injuries occurs, in prostheses with a significant difference in the prosthetic field and prosthetic surface, usually as a result of expired dentures, as use and in certain painful areas of the alveolar ridge, usually of the lower jaw. Dental adhesives in the form of plates are usually viscous fibers, alginate and polypropylene fibers.

Different forms of application have different characteristics.

Cream as an adhesive is usually easier to apply,

but goes beyond the denture and often sticks to the outer surface. It is difficult to remove and sometimes uncleaned areas remain, both on the prosthetic field and on the inside of the prosthesis.

The plate-shaped adhesive is easy to apply, needs to be cut with scissors or adjusted by the patient. Eliminates discomfort and pain from existing decubitus injuries better than cream adhesive. With larger differences in the inner surface of the prosthesis and alveolar ridge, they have a better filling effect [18]. The main reason for using the adhesives was to improve the retention of the prostheses [19]. The period of use of adhesives for complete dentures was from 1 year to 30 years [20,21].

Several products are available in the market e.g:

- ✓ *Snug Denture Cushions* – Suitable for both upper and lower dentures, hold snug dentures tightly using a soft and flexible custom fit.
- ✓ *Ezo Denture Cushions, Lower Heavy* – The design of this adhesive helps hold dentures in place by creating the vacuum that naturally exists with perfectly fitted dentures.
- ✓ *Cushion Grip Thermoplastic Denture Adhesive* is a thermoplastic denture adhesive that will not slip. Of course, dentures will also hold securely in place throughout the day, and the chewing pattern will not change this fact. The glue is not washed off with water, it is safe for plastic and porcelain dentures. The product manufacturers guarantee 4-day excellent service.
- ✓ *Protefix and Corega* adhesive creams
- ✓ *Fittydent* – The insoluble adhesive paste provides strong bioadhesive and cohesive forces between the polyvinyl group and the carboxymethyl cellulose. The carboxymethyl cellulose provides a quick hold and the polyvinyl group holds it for a long interval, and thus it increases the retention of mandibular complete dentures [22]

Denture adhesives improved the retention of dentures more so for poorly fitting dentures than well-fitting dentures [23,24,25].

In Bulgaria, the supply of pads by dentists and manufacturers is limited. Rarely dentists offer plate-shaped adhesive products to their patients, on the one hand, due to the lack of information, and on the other hand, due to the less frequent supply of products by suppliers.

## Conclusion

Dental denture adhesives are an indispensable

helper in prosthetic dentistry, especially for removable dentures. Available in various forms, such as cream, powder or ready-made pads, they make it easier for both the patient and the clinician to find the most appropriate treatment. Provide comfort

with retention, stabilization and improve functions. Detailed knowledge of the mechanism of action and proper use by the patient is the key to the successful application of dental adhesives in the daily practice of the dentist.

# References:

1. Kapur K. A clinical evaluation of denture adhesives. *J Prosthet Dent* 1967;18:550–8.
2. Stafford O, Russell C. Efficiency of denture adhesives and their possible influences on oral microorganisms. *J Dent Res* 1971;50:832–7.
3. Yankell S. Overview of research and literature on denture adhesives. *Compend Contin Educ Dent*. 1984;4(Suppl):518–21.
4. Özcan M, Kulak Y, Arikan A et al. The attitude of complete denture wearers towards denture adhesives in Istanbul. *J Oral Rehabil* 2004; 31:131–134.
5. Adisman IK. The use of denture adhesives as an aid to denture treatment. *J Prosthet Dent* 1989 62 : 711 –715
6. Grasso J. Denture adhesives. *Dent Clin North Am* 2004; 48: 721– 733.
7. Zarb G, Bolender C, Eckert S, Jacob R, Fenton A, Mericske-Stern R. Prosthodontic treatment for edentulous patients: complete dentures and implant-supported prostheses. St Louis: Mosby; 2004. p. 442.
8. Grasso JE. Denture adhesives: changing attitudes. *J Am Dent Assoc* 1996; 127: 90– 96.
9. Slaughter A, Katz V, Grasso J. Professional attitudes toward denture adhesives: a Delphitechnique survey of academic prosthodontics. *J Prosthet Dent* 1999;82:80–89.
10. Coates AJ. Usage of denture adhesives. *J Dent* 2000; 28: 137 – 140.
11. Limpuangthip N, Somkotra T, Arksornnukit M. Modified retention and stability criteria for complete denture wearers: a risk assessment tool for impaired masticatory ability and oral health-related quality of life. *J Prosthet Dent*. 2018;120(1):43–49. doi: 10.1016/j.prosdent.2017.09.010. [PubMed] [CrossRef]
12. Kailembo A, Preet R, Stewart Williams J. Common risk factors and edentulism in adults, aged 50 years and over, in China, Ghana, India and South Africa: results from the WHO study on global AGEing and adult health (SAGE) *BMC Oral Health*. 2016;17:29. doi: 10.1186/s12903-016-0256-2
13. Pinto D. Chain Drug Review, January 5, 1998;20:46
14. Duqum I, Powers KA, Cooper L, Felton D (2012) Denture adhesive use incomplete dentures: clinical recommendations and review of the literature. *Gen Dent* 60(6):467
15. Salman YM (2001) Effect of denture adhesives on the retention of maxillary complete denture. In: M.Sc. D thesis, College of Dentistry, University of Baghdad
16. Kumar PR, Shajahan PA, Mathew J, Koruthu AAP, Ahammed MF. Denture Adhesives in Prosthodontics: An Overview. *J Int Oral Health*. 7(Suppl 1):93–95
17. Mauri-Obradors E, Estrugo-Devesa A, Jané-Salas E, Viñas M, LópezLópez J (2017)
18. Ibraheem E, El-sisy A. Comparing the effect of three denture adhesives on the retention of mandibular complete dentures for diabetic patients (randomized clinical trial) December 2019 *Bulletin of the National Research Centre* 43(1) DOI: 10.1186/s42269-019-0052-7
19. El-Mekawy; Amira Gomaa, Ahmed Habib, Comparison of three different forms of denture adhesives: Direct measurement of denture retention and, study of patient satisfaction, *Egyptian Dental Journal*, Vol. 58, 1:9, July, 2012
20. Özkan M, Kulak Y, Arikan A, Silahtar E. The attitude of complete denture wearers towards denture adhesives in Istanbul. *J Oral Rehabil* 2004; 31:131–4
21. Kossioni AE. Prevalence and factors associated with the use of denture adhesives by older complete denture wearers. *Eur J Prosthodont Restor Dent*. 2018;26(4):197–201. [PubMed] [Google Schola
22. Polyzois GL, De Baat C. Attitudes and usage of denture adhesives by complete denture wearers: a survey in Greece and the Netherlands. *Gerodontology* 2012;29:e807–14
23. Yegin E, Akpınar YZ, Yavuz T, Aslan MA. Effect of different denture adhesives on retention of complete dentures: an in vivo study. *Journal of Adhesion Science and Technology* 2017, 31(18):1–9
24. Chew LC, Boone ME, Swartz ML, Phillips RW (1985) Denture adhesives: their effect on denture retention and stability. *J Prosthet Dent*. 13:152–159
25. Ikebe K, Matsuda K, Kagawa R, Enoki K, Okada T, Yoshida M, Maeda Y. Masticatory performance in older subjects with varying degrees of tooth loss. *J Dent*. 2012;40(1):71–76.
26. Shankar R. Denture adhesives for complete denture: a literature review, *Indian Journal of Dental Sciences*, Vol. 1 Issue 1 Jan 2010